Hole-in-the-Ground (HIG) Ranch
Site Plan Agreement between HIG Ranch, National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW) For the Template Safe Harbor Agreement for Coho Salmon (*Oncorhynchus kisutch*)

Introduction

This Site Plan for the Template Safe Harbor Agreement (Agreement) for Southern Oregon and Northern California Coast (SONCC) Evolutionarily Significant Unit (ESU) of coho salmon (the Covered Species) is between the Hole in the Ground Ranch, operated by Emmerson Investments, Inc. (hereinafter referred to as the Permittee), National Marine Fisheries Service (NMFS) and California Department of Fish and Wildlife (CDFW). This Site Plan Agreement, combined with the measures prescribed in the Agreement, may serve as the basis for NMFS to issue a federal enhancement of survival permit (Permit) to the above named Permittee pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended (ESA). The joint and respective responsibilities of NMFS, CDFW and the Permittee are detailed in the Template Safe Harbor Agreement. The Site Plan Agreement is subject to terms of the Template Safe Harbor Agreement and Permit.

This Site Plan Agreement documents site-specific information detailing the Permittee's enrolled property, including the location and management authority of the property, its baseline conditions, existing and, as available, proposed future land-use activities, and the duration of this Site Plan Agreement and requested permit. This Site Plan Agreement also documents the agreed-upon conservation measures to be undertaken by the Permittee on the enrolled property that are expected to benefit coho salmon.

Enrolled Property: Hole in the Ground Ranch

Location

The Hole in the Ground Ranch (Enrolled Property or Ranch) is located north of Lake Shastina, and west of Big Springs Road *(Figure 1)*. The Ranch shares a western and southwestern boundary with the EII Shasta Springs and Seldom Seen ranches. The south fenceline is also common with the Mallet Hidden Valley Ranch (MVHR). To the north lie the Cardoza Ranch and the Big Springs Ranch. On the northeast and east are other small private landowners. Table 1 lists the Enrolled Property APNs

Streams flowing through the Ranch include the Shasta River, Parks Creek, and Hole in the Ground Creek. The confluences of the creeks with the Shasta River are off the property.

For the purposes of this Safe Harbor Agreement, activities on the Ranch have the potential to influence the Upper Shasta River and Lower Parks Creek sub-reaches.

Enrolled Property Information

The Ranch is used primarily for beef cattle production and is currently managed as an integrated unit with other of the Permittee's ranches. Three contiguous properties, including the Hole in the Ground are managed for pasture for beef cattle, while the Hay Ranch is managed for hay for winter feed to support the three cattle ranches. Using hay from the Hay Ranch during the winter minimizes the amount of grazing necessary to maintain the cattle at the other sites, which allows the pasture grasses to be

maintained at very high levels of ground cover. The high level of ground cover minimizes surface erosion and fine sediment contribution to the sensitive aquatic systems on the other three ranches, and inhibits the establishment of noxious weeds. Maintaining the cattle locally, year-round, helps control the introduction of non-endemic species, e.g. invasive plants.

Figure 1. Hole in the Ground Ranch: Property Description

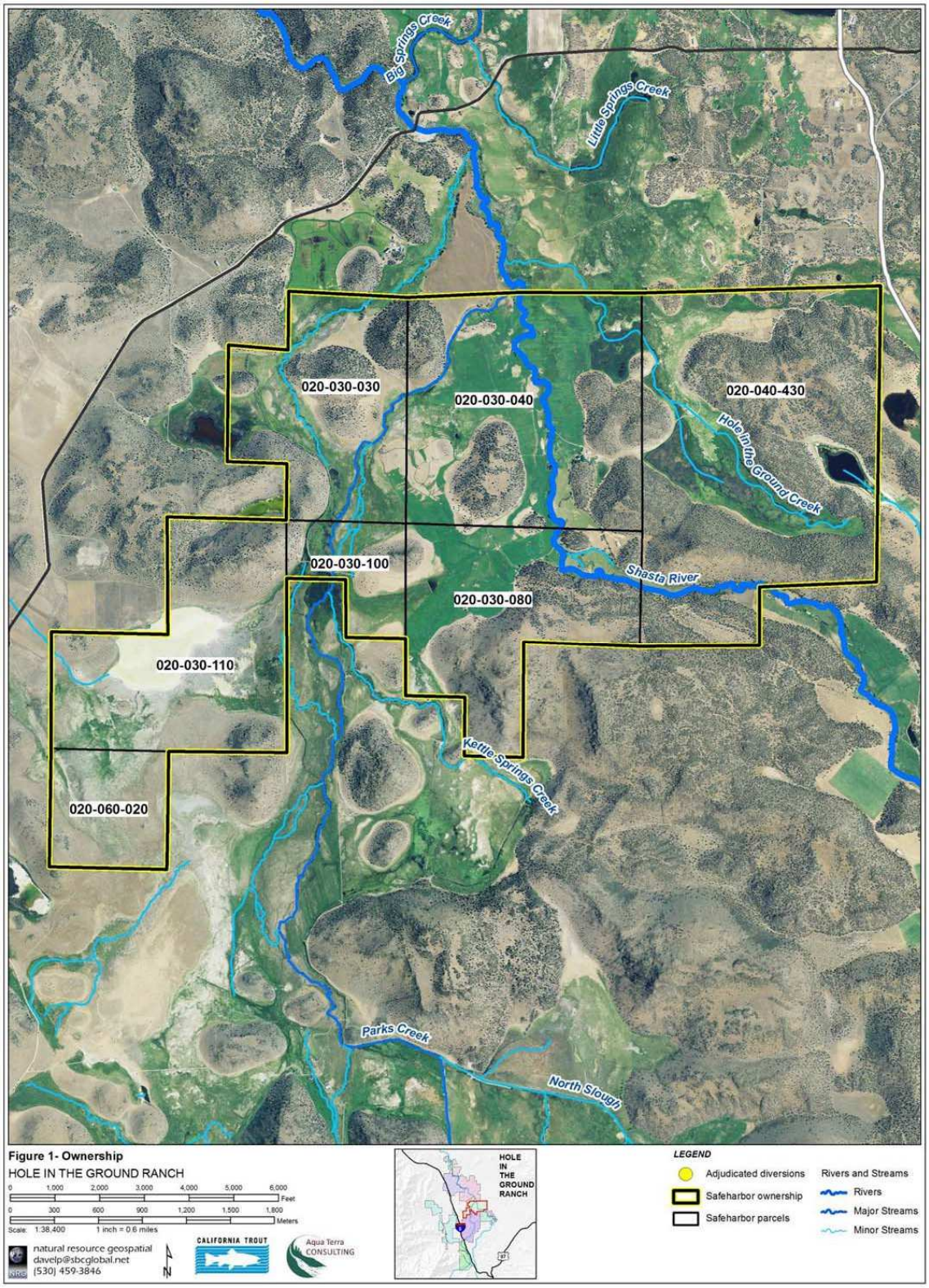


Table 1. Legal Description of Property

APN	ASSESSED_ACRES	OWNER	REFERENCE
020030030	400	EII	HOLE IN THE GROUND RANCH
020030040	640	EII	HOLE IN THE GROUND RANCH
020030080	440	EII	HOLE IN THE GROUND RANCH
020030100	120	EII	HOLE IN THE GROUND RANCH
020030110	480	EII	HOLE IN THE GROUND RANCH
020040430	880	EII	HOLE IN THE GROUND RANCH
020060020	160	EII	HOLE IN THE GROUND RANCH

Description of Water Rights

Hole in the Ground Ranch: There are three sources of water for irrigation and stock watering on the Ranch.

The primary source of water is from an "In Lieu" or "Prior Rights" Agreement with Montague Water Conservation District (MWCD).The owner of the property, currently called the Hole in the Ground Ranch, continues an agreement, made by the owner in the 1920's, with the MWCD to be furnished storage waters from the reservoir (i.e. Lake Shastina) to the lands of the property owner for the loss of use of the natural flow of the river that was used for irrigation prior to the building of the MWCD dam in that era. The amount "shall be superior to the rights of the District," and shall be delivered "at such times and in such amounts as ordered" by the property owner during each calendar year until the total is delivered. The owners of the lands currently called the Seldom Seen Ranch, recorded similar agreements with MWCD.

Since the original agreement, diverters have cooperated to prevent waste or unreasonable use. The amount of water actually ordered by the Permittee every year has varied due to annual hydrologic variation in the total storage in the reservoir and irrigation demand but has been less than or equal to the combined amount reserved for the "Prior Rights" of the owner of the Seldom Seen (924 ac-ft) and the owner of the Hole in the Ground (596 ac-ft) ranches, when both properties have been under the same owner, as is the current condition.

The decreed water rights for the Enrolled Property to the use of the natural flow of the Shasta River are defined in paragraphs 72, 382, and 383 of the Shasta River Adjudication Proceeding, Judgment and Decree entered December 30, 1932 (Shasta River Decree). The Shasta River Decree establishes the relative rights of the various claimants according to the doctrine of prior appropriation. The above-described "Prior Rights Agreement" is based on these same rights. The Permittee has reviewed the records for the water rights for the Enrolled Property and certified the use described herein is considered otherwise legal under the Decree and Watermaster District.

The Ranch also uses water from two springs (the second and third sources of water for irrigation and stock watering). One of these, "Clear Spring", is diverted under License 4151 from the State Water Resources Control Board, Division of Water Rights. Clear Spring flows a few feet, unimpeded, from its source at the edge of the Shasta River and the river is used to convey the water right for re-diversion at the Pump Diversion 0.5 mile downstream. The license is for the purposes of both irrigation and stockwater and is limited to the amount actually beneficially used for those purposes and shall not exceed 2.5 cfs to be diverted in the period "from about March 1 to about November 1 of each year, for irrigation and throughout the year as required for stockwatering". The POD is under the supervision of the Watermaster and as a practice, diverts less than the permitted amount to accommodate spring fluctuation and water quality for fisheries.

The second spring originates on the Seldom Seen Ranch (See Table 2) and is re-diverted at either POD on the Ranch under a riparian claim. Surface flow generally only appears in wet years and it is not necessarily used in every year it develops. When available and use is anticipated, the flow is measured at its source on the Seldom Seen Ranch and the amount is offset by a corresponding amount of stored (In Lieu) water *not* released from Lake Shastina, thereby making the stored water allotment last until later in the irrigation season. Measurement records do not exist prior to 2003 and since diversion does not occur

every year, the record since then is also sparse. The most recent recorded amount was for a maximum 1040 acre-feet annual use, as reported to the DWR-State Board on eWRIMS under ID S023972. In years when the spring flows, it appears as a small seep in Feb-April, but relatively quickly can increase to more than two cfs, sometimes to as much as nine cfs. Usually sometime in June, if not sooner, the flow just as quickly diminishes to zero.

There are four Points of Diversion (POD) on the Ranch.

Working downstream from the south property line on the Shasta River, the first POD is the Gravity Ditch/Diversion, consisting of a headgate on the river-right bank of the Shasta River. Head is created by a constructed roughened channel to divert roughly 4 cfs through a typical irrigation season. The Gravity Ditch supplies water to stock and irrigates pastures on the east side of the river. The POD is also known as DWR Diversion 165.

The second POD is the Clear Spring, as described previously.

The third POD supplies a pumping station and sump located approximately 250 feet off-channel, approximately 0.8 mile downstream of the Gravity Diversion. There are two pumps, one with an approximate capacity of 2000± gallons per minute and the other of 2200± gallons per minute. Depending on crop demand and water supply, typical operation is for one or the other pump to be operated to deliver water to the head of a distribution ditch that is higher than the river. This and lateral ditches supply irrigation water to pastures on the west side of the river and the east side of Parks Creek. This POD, the Pump Diversion, is also known as DWR Diversion 166. Both POD and other irrigation infrastructure may be seen in Figure 2.

Both head-of-ditch diversions (165 & 166) are screened by CDFW design criteria and were upgraded in 2007, with a grant to MWCD, to eliminate fish passage and water quality problems associated with the previous flashboard dam configurations. The Gravity Diversion is equipped with a flat-plate, self-cleaning fish screen and the fish screen at the Pump Diversion is a cone screen configuration.

A fourth POD on the Ranch is on Parks Creek in Section 20 of Township 43N Range 04W (Longitude -122.44445E, Latitude 41.56325N). This is the diversion for the Cardoza Ranch and is not controlled by the Permittee, although the crossing at the diversion provides essential infrastructure for movement of livestock and equipment on the Enrolled Property.

Table 2 displays the water right amounts, points of diversion, and irrigated acres served by those rights on the Ranch. The information presented in Table 2 is a good-faith effort to present the irrigation and stock water management by the Permittee for the purpose of understanding the potential changes through time and space from the ranch stewardship and the context for improving aquatic habitat conditions for the covered species. It may not be suitable for any other purpose. The variables displayed in the table are a compilation of data and estimates from a variety of sources and through a range of hydrologic conditions.

Figure 2. Hole in the Ground Ranch: Water Use and Management

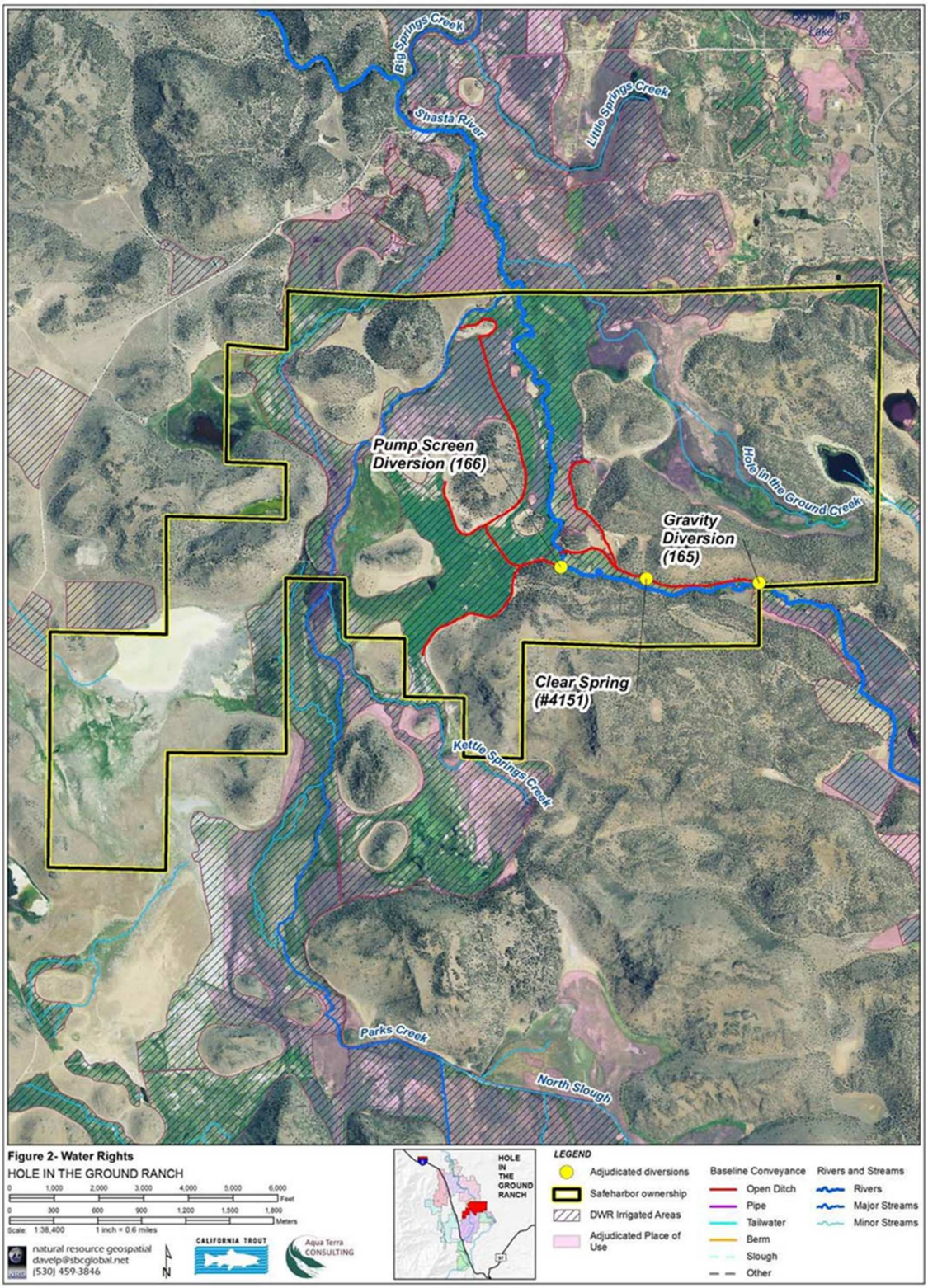


Table 2 –

Hole in the Ground Ranch – Water Rights, Amounts, Timing, Days Used, and Acreage							
Report	**Diversion #/ Water Source**	**Description**	**Season**	**Licensed, Riparian, or Adjudicated Amounts**	**Ac-Ft per Season Diverted**	**Approx. Days per Season Diverted**	**Acreage Irrigated with Diversion**
Watermaster	165/MWCD Reservoir	Prior Rights from MWCD Storage	March 1 – Nov 1	<= 1520 AF	<= 1520	155	132 (and Stock Watering)
Watermaster	166/ MWCD Reservoir						201
License #4151	Clear Spring/166	Clear Spring	March 1 – Nov 1	<= 2.5 cfs	<= 1210	180	400±
S023972	165,166/unnamed spring	Shasta River (re-divert from Seldom Seen Spring)	March 1 – Nov 1	Riparian	<= 938	0 - 80	260
Watermaster	165/Shasta River	Gravity Diversion	Nov 1 – March 1	<=0.25 cfs	<= 5	121	Stock Water
License #4151	Clear Spring/166	Clear Spring	Nov 1 – March 1	<= 2.5 cfs	<= 5	121	Stock Water

C. Baseline Conditions

C.1. Baseline

Baseline Conditions are the habitat conditions for the Covered Species on the Enrolled Property when NMFS approves this Site Plan Agreement. The Enrolled Property is within the Upper Shasta River and Lower Parks Creek Reaches of the Agreement Area. Baseline Conditions for the Enrolled Property are the conditions described in the Agreement for these reaches of the Shasta River and Parks Creek.

C.2. Elevated Baseline

Elevated Baseline Conditions are certain Baseline Conditions improved as a result of certain Beneficial Management Activities described below.

Table 3 summarizes the Beneficial Management Activities required to maintain Baseline Conditions and to achieve Elevated Baseline Conditions on the Enrolled Property for the term of the Site Plan Agreement. The Beneficial Management Activities implement habitat enhancement actions recommended in the Agreement for the two reaches, the Upper Shasta River and Lower Parks Creek. Section E below describes the activities in more detail.

Table 3: Net Conservation Benefit Actions Summary: Hole in the Ground Ranch

Habitat Parameter	Net Conservation Benefit Actions			
	Projects for Present Day Baseline (Completed)	**Present Day Baseline (Maintain)**	**Elevated Baseline Condition (Upgrade)**	**Other Beneficial Management Activities**
Hydrology/Water Quality	Pump Diversion, which formerly impounded Shasta River, upgraded to roughened channel configuration and maintained and operated in compliance with current CDFW requirements for passage, bypass flows, and screening (2007) Repaired and maintaining tailwater berms in pastures bordering stream channels Fencing completed in (or about) 2011 excluding cattle from accessing channel and banks IRRIGATION EFFICIENCY UPGRADE: 500 feet of	Cattle access to the channel will be excluded or restricted to crossings, watering access points, and/or limited season/stocking/duration that conserves water quality Agree to continue maintenance of tailwater berms Agree to continue current irrigation practices to minimize/eliminate tailwater Agree to maintain concrete ditch lining on Pump Diversion distribution system	Agree to continue cooperation in project to rebuild the Cardoza Diversion system (122.44445W, 41.56325N), adjusting stocking to reflect loss of pasture productivity (100± acres) *Time Frame: Underway; Completion Estimated within 7years of permit issuance* Agree to seek matching funds to and install riparian fencing along Hole in the Ground Creek. *Time Frame: Within 5 years of permit issuance*	Agree to participate in studies to refine Upper Shasta River Flow Management Strategy, including role of Seldom Seen Spring *Time Frame: For 10 years from permit issuance* Agree to redesigning and rebuilding Gravity Diversion to increased capacity in order to facilitate Upper Shasta River Diversion Management Plan (*Hole in the Ground Section E.2.a.)* *Time Frame: Underway; Completion Estimated within 5 years of permit issuance* Agree to redesigning and rebuilding pumping facility at Pump Diversion to facilitate Upper Shasta River

Habitat Parameter	Net Conservation Benefit Actions			
	Projects for Present Day Baseline (Completed)	**Present Day Baseline (Maintain)**	**Elevated Baseline Condition (Upgrade)**	**Other Beneficial Management Activities**
	earth-lined ditch replaced with pipe, also reducing potential for irrigation tailwater returning to channel as surface flow (20??) IRRIGATION EFFICIENCY UPGRADE: 1500 feet of concrete-lined ditch repaired with grant through SVRCD (2013) IRRIGATION EFFICIENCY UPGRADE: Board & canvas irrigation turn-outs upgraded to gates on ≥300 feet of ditch with grant through SVRCD (2013) Modified irrigation practices to control tailwater and avoid its entering streamflow as surface water (2010) Cooperated with studies & surveys for project to alter neighbor's diversion at W122.44445, N41.56325 Participated in Irrigation Efficiency Study to evaluate opportunities for additional instream flow for fish habitat (Davids Engineering 2011) Participated in Tailwater			Diversion Management Plan (*Hole in the Ground Section E.2.a)* *Time Frame: Underway; Completion Estimated within 5 years of permit issuance* Prior to completion of diversion combining project, agree to collect further ditch efficiency data to accurately quantify efficiency savings to forebear after diversion combining project is implemented. Upon completion of the diversion combining project, agree to forebear diversion of a portion of Clear Spring proportionate to the efficiency savings along upgraded Gravity Ditch alignment, (estimated at 0.7 cfs) per Upper Shasta River Diversion Management Plan, (*Hole in the Ground Section E.2.a.*) *Time Frame: Underway; Completion Estimated within 5 years of permit issuance* Upon completion of the diversion combining project, agree to exchange with MWCD for Clear Spring water in late spring – summer (per Upper

Habitat Parameter	Net Conservation Benefit Actions			
	Projects for Present Day Baseline (Completed)	**Present Day Baseline (Maintain)**	**Elevated Baseline Condition (Upgrade)**	**Other Beneficial Management Activities**
	Assessment study (SVRCD/AquaTerra 2011) Cooperated in Interim Instream Flow Needs study (McBain & Trush, Inc, 2013) Participated in flow/diversion management experiments (CDFW 2013 - 2015) Cooperated in studies to evaluate Hole in the Ground Creek for water quality improvements, irrigation supply for neighboring property owner Appropriative claim for Clear Spring managed to protect water quality			Shasta River Flow Management Strategy (*Hole in the Ground Section E.2.a.*) *Time Frame: Underway; Completion Estimated within 5 years of permit issuance* Agree to include Ranch pastures in Project Area for testing effectiveness of soil moisture sensor technology to increase diversion efficiency, implement routine use where appropriate, and adjust water management accordingly *Time Frame: During first decade from Permit Issuance* Will work cooperatively to solve issue of warm surface water, from source not on Permittee, entering Hole in the Ground Creek near north property line *Time Frame: Within 5 years of permit issuance*
Passage/Migration/ Screening	Until 2007, no known use of sub-reach by salmonids. In 2008 Permittee provided access for CDFW evaluation, subsequently documenting use of the sub-reach as rearing habitat *(CDFG, 2009, Shasta River Juvenile Coho*	Agree to maintain fish passage through the roughened channel at the POD for the two HIG diversions on the Shasta River	Agree to continue cooperation in project to change Cardoza Diversion & upgrade crossing to eliminate potential salmon migration barrier *Time Frame: Underway; Completion Estimated within 7? years of permit issuance*	Agree to develop and implement beaver management plan to alter or provide access around potential migration barriers at dams *(Hole in the Ground Section E.2.c.) Time Frame: Within 5 years of permit issuance*

Habitat Parameter	Net Conservation Benefit Actions			
	Projects for Present Day Baseline (Completed)	**Present Day Baseline (Maintain)**	**Elevated Baseline Condition (Upgrade)**	**Other Beneficial Management Activities**
	Habitat and Migration Study) Gravity Diversion and Pump Diversion, previously flashboard dams, reconstructed with roughened channel configuration with grant through MWCD (2007); maintained and operated in compliance with current CDFW requirements for passage, bypass flows, and screening			
Large Wood/Channel Type/Capability	Dam-building beavers are not discouraged except where diversions, crossings, or fencing are impaired. Fall, 2015, there were 11 beaver dams in various stages of maintenance			Agree to provide access for addition of large wood enhancement, up to 15 sites, in the Shasta River *(Hole in the Ground Section E.2.d.; Figure 5) Time Frame: Within 10 years of permit issuance* Post-alteration of Cardoza Diversion, agree to work collaboratively with Agencies to evaluate and add instream LWD to Lower Parks Creek, *(Hole in the Ground Section E.2.d.)Time Frame: Within 5 years of completion of diversion alteration project*

Habitat Parameter	Net Conservation Benefit Actions			
	Projects for Present Day Baseline (Completed)	**Present Day Baseline (Maintain)**	**Elevated Baseline Condition (Upgrade)**	**Other Beneficial Management Activities**
Riparian Condition/ Acres	Fencing completed on Shasta River and lower Parks Creek in (or about) 2011 excluding cattle from riparian habitat Developed one off-channel stock watering tanks	Will replace at least 20% of riparian fencing if needed due to high flow damage Agree to maintain riparian exclusion fencing or, if modified, riparian pasture fencing with associated grazing plan Agree to cap number of vehicle and livestock access points to current number	Agree to install balance of riparian fencing along Parks Creek (±40%) as riparian pasture borders consistent with recommendations of University of California Cooperative Extension (UCCE) Range Conservation Specialists *(Attachment:* UCCE Riparian Grazing Recommendations for Hole in the Ground Ranch) *Time Frame: Temporary fencing will be used for up to the first five years after permit issuance. Permanent fencing will replace temporary by the sixth year after permit issuance*	With additional funding, Permittee agrees to take part in riparian planting projects where existing riparian habitat is less than site-potential along the Shasta River. *(Hole in the Ground Section E.2.c.) Time Frame: Within 15 years of permit issuance* If maintenance of existing riparian exclusion fencing becomes untenable, agree to consult with UCCE Range Conservation experts and develop and document an alternative riparian grazing plan Post-alteration of Cardoza Diversion, agree to work collaboratively with Agencies to assess and, **implement** riparian enhancement &/or instream habitat improvement projects in Lower Parks Creek *(Hole in the Ground Section E.2.d.) Time Frame: Within 5 years of completion of diversion alteration project*
Instream Habitat Complexity (alcoves, side channels and floodplains)				Post-alteration of Cardoza Diversion, agree to work collaboratively with Agencies to assess

Habitat Parameter	Net Conservation Benefit Actions			
	Projects for Present Day Baseline (Completed)	**Present Day Baseline (Maintain)**	**Elevated Baseline Condition (Upgrade)**	**Other Beneficial Management Activities**
				and, when matching funds are acquired, **implement** instream habitat improvement projects including channel morphology modifications in Lower Parks Creek *(Hole in the Ground Section E.2.d.) Time Frame: Within 5 years of completion of diversion alteration project* Agree to develop and implement beaver management plan *(Hole in the Ground Section E.2.c) Time Frame: Within 5 years of permit issuance*
Substrate Quality	Cooperated in study to evaluate gravel composition and quality (McBain and Trush, et al., 2010) Cooperated with MWCD to improve spawning habitat quality by pulse flows of water released (above irrigation demand) and allowed to flow unimpaired and un-diverted	Seven livestock/vehicle crossings will be maintained as rocked fords *(Hole in the Ground Sections E.2.c. and E.2.f.)*		Agree to provide access to implement spawning gravel enhancement, up to 4 sites in the Shasta River *(Hole in the Ground Section E.2.e.; Figure 5 Time Frame: Within 10 years of permit issuance* Post-alteration of Cardoza Diversion, agree to work collaboratively with Agencies to assess and **implement** spawning habitat enhancement projects in Lower Parks Creek *(Hole in the Ground Section E.2.e.) Time Frame: Within 5 years of completion of diversion alteration project*

D. Routine Land Use

D.1. Present Routine Land Use

The Enrolled Properties consists of 3100± acres. The Ranch is managed as a cow-calf operation running about 500 pairs. Together with replacement heifers and bulls, the Ranch carries about 650 -700 head. Calving typically begins in early October and lasts through December. Calves are weaned, beginning at the end of July and shipped in August and September before the next round of calving, with some heifers kept each year for replacements.

Cattle are fed primarily by grazing irrigated pastures (720 acres) and dry land range (2360 acres) supplemented by hay. Supplemental feeding begins about the end of November and lasts through the end of March, by which time pasture and range conditions are sufficient to sustain the herd.

As mentioned in the introductory section, water is conveyed principally in open, unlined ditches. Currently, a 1.5 mile section of the Pump Diversion distribution ditch is lined with concrete to improve efficiency. Deteriorated segments of that ditch have been repaired with new concrete with a grant through the Shasta Valley Resources Conservation District.

There are three rocked vehicle crossings on the Ranch. These are also used as stock crossings. Four additional rocked fords are used for stock and ATVs only. All wet crossings serve as stockwatering access as well. There are three crossings over culverts, all of which are used for livestock, ATVs, and vehicles/small equipment (e.g. backhoe). There is one stock watering point on Parks Creek that is not a crossing.

The following Routine Land Use activities will be implemented in accordance with the relevant AMMs described below in Section D.2.

D.1.a. Irrigation Management (*Figure 2)*

Activities:

- Positioning and repositioning headgates for irrigation and stock watering throughout irrigation season (and to a lesser extent through the winter season) as crop demand, stock water needs, and water supply dictate.
- Start pump at Pump Diversion
- Ongoing maintenance, management, and repair of boulder weirs
- Maintain measuring device(s*)*

D.1.b. Irrigation Maintenance *(Figure 2)*

Activities:

- Diversion intake maintenance and cleaning;
- Operation and maintenance of diversion measuring devices
- Board or tarp removal/placement in ditches;
- Pump maintenance;
- Ditch cleaning and maintenance, including concrete lined sections;
- Operation and maintenance of fish screen e.g. cleaning
- Tailwater berm maintenance

D.1.c. Riparian Pasture Grazing Management

Activities: None currently. See *Beneficial Management Activities* for proposal to implement riparian pasture grazing in three fields

D.1.d. Fence Maintenance

Activities:

- Maintain narrow-corridor riparian exclusion fencing
- Install and maintain temporary electric fencing for riparian pasture boundaries
- Install fixed fencing for riparian pasture boundaries
- Maintain panels and/or fencing in riparian zone to limit livestock access to channel at water gaps, crossings, and property boundaries
- Remove and/or replace panels and/or fencing at water gaps for high stream flow events

D.1.e. Road Use and Maintenance

Activities:

- Use and maintain three vehicle fords across Shasta River, and three piped (CMP) crossings, two over Hole in the Ground Creek and one over Parks Creek
- Use and maintain a little over one-quarter mile of road within 75 feet of the Shasta River on the Ranch. The two road segments (500' river-left, north of the north crossing; and three shorter segments on river-right, accessing the Gravity Diversion) receive light use, primarily of Ranch ATVs or, occasionally, pickups or a backhoe. Use of this road has increased significantly over the last ten years to accommodate personnel conducting fisheries and water quality investigations. Traffic is not expected to increase above current levels. Traffic is nevertheless light and the side slope between the road and the river is almost flat and covered with perennial grasses or riparian vegetation with very little sign of erosion. If used by heavier trucks or equipment, it would be to implement a Beneficial Management Activity and likely therefore not used during the wet season, except in an emergency

D.1.f. Livestock and Vehicle Wet Crossings and Watering Lanes

Activities:

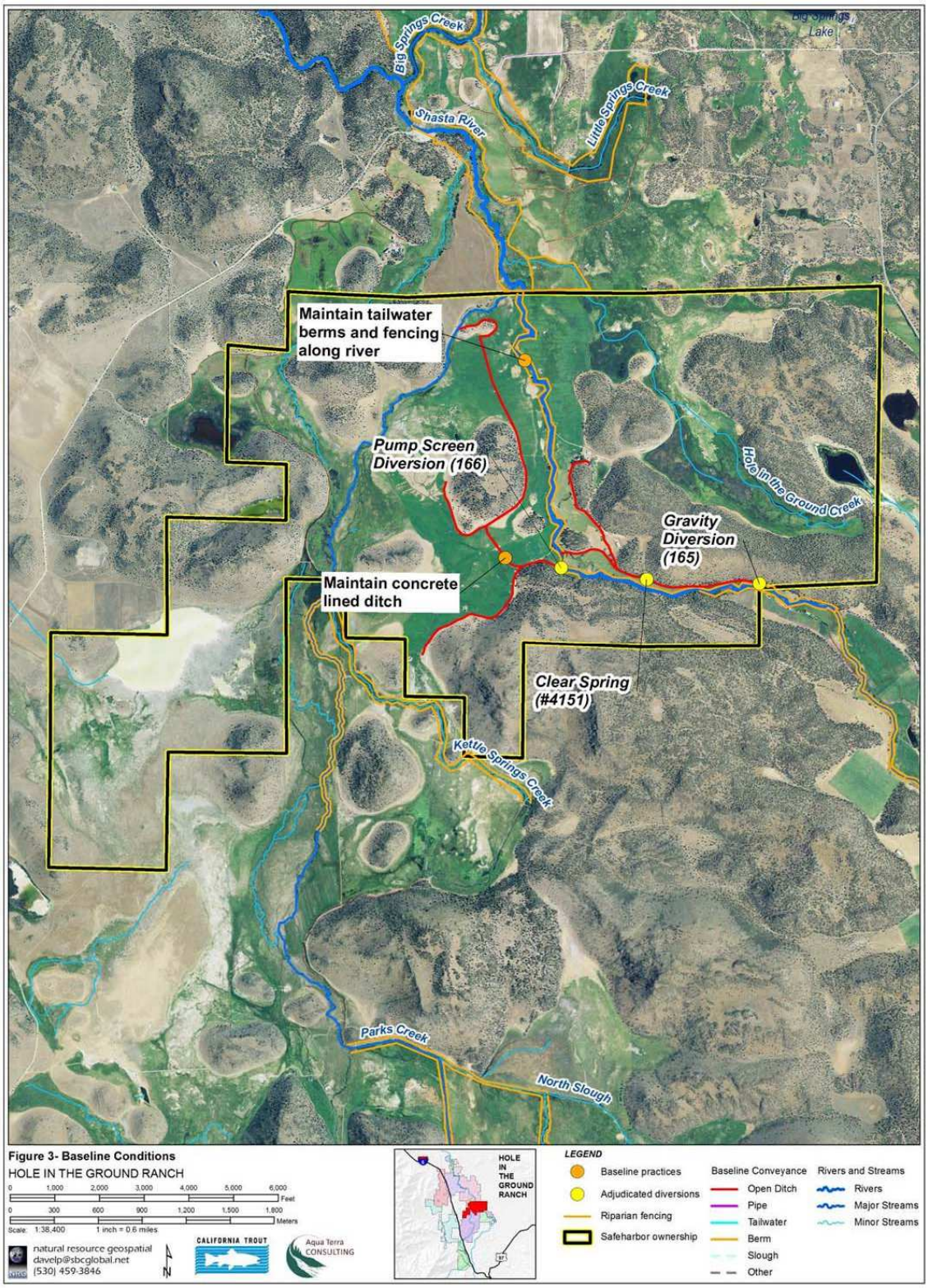
- Use and maintain three vehicle fords across Shasta River
- Periodic use of wetted fords for crossing cattle at seven designated crossings (inclusive of three vehicle fords)
- Crossings will be maintained for crossing vehicles and livestock and watering livestock
- One instream stockwatering only point will be maintained using panels or other effective livestock management equipment to limit access to approximately twenty-five linear feet of wetted channel to meet watering needs for up to 250 pairs.

D.1.g. Herbicide (Weed Management), Fertilizer, or Pesticide Use)

Activities:

- Periodic use of herbicide by the County or the owner to control invasive plants at two hay barns and two sets of corrals. All facilities are more than 500' from a stream.

Figure 3. Hole in the Ground Ranch: Baseline Conditions


Big Springs Creek
Big Springs Lake
Little Springs Creek
Shasta River
Maintain tailwater berms and fencing along river
Pump Screen Diversion (166)
Hole in the Ground Creek
Gravity Diversion (165)
Maintain concrete lined ditch
Clear Spring (#4151)
Kettle Springs Creek
Parks Creek
North Slough
Figure 3- Baseline Conditions
HOLE IN THE GROUND RANCH
0 1,000 2,000 3,000 4,000 5,000 6,000 Feet
0 300 600 900 1,200 1,500 1,800 Meters
Scale: 1:38,400 1 inch = 0.6 miles
natural resource geospatial
davelp@sbcglobal.net
(530) 459-3846
N
CALIFORNIA TROUT
Aqua Terra CONSULTING
HOLE IN THE GROUND RANCH
LEGEND
Baseline practices
Adjudicated diversions
Riparian fencing
Safeharbor ownership
Baseline Conveyance
Open Ditch
Pipe
Tailwater
Berm
Slough
Other
Rivers and Streams
Rivers
Major Streams
Minor Streams

D.2. Avoidance and Minimization Measures

D.2.a. Water Diversion and Diversion Facilities

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

> Install a locking head gate or valve sized appropriately for the authorized diversion, that can regulate flow, and a functional measuring device or flow meter on any structure or facility connected to a stream used to divert water to facilitate better control and monitoring of water delivery within three years, unless specified otherwise in the site plan, of the effective date of the Agreement on or in all water diversion structures identified in this Agreement. The designs for head gates or valves and measuring devices in State Watermaster or Special Watermaster District Service areas shall be approved by DWR or said Special District, if applicable, in coordination with the Parties. All measuring devices and methods of water measurement shall be constructed and maintained to meet a 10% measuring accuracy for points of diversion that divert greater than or equal to 200 acre feet per year, and a 15% measuring accuracy for points of diversion that divert less than 200 acre feet per year. Data from these devices will be included in the annual SHA report.
>
> Fish passage will be provided for all life stages when sufficient flows are available
>
> Contact NMFS and CDFW at least five (5) days before installing any dam or instream structure that could result in stranding of fish, or before changing the operation of any existing dam or instream structure that could result in stranding of fish. The types of activities that typically could result in stranding include rapid drawdown of flow or dewatering of the stream channel downstream of the diversion or within diversion ditches between the point of diversion, fish screen and bypass return flow channel.
>
> Construct, operate, maintain, and remove push-up and other temporary dams as described in the Agreement. Push-up dam or weir construction activities shall commence no earlier than May 1 and no later than November 1. Permittee may commence push-up dam construction activities prior to May 1 if (a) Permittee notifies NMFS and CDFW at least seven (7) days in advance of any dam construction proposed to occur prior to May 1, (b) a survey is completed by NMFS, CDFW or a mutually agreed-upon qualified biologist sufficient to determine the presence and distribution of any Covered Species, and (c) a determination by NMFS and CDFW whether and when the activity may proceed.

Monitoring

Log of what in-water work occurred and what AMMs were implemented shall be included in the annual report

Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:

> 1. Establish, label, and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc.)
>
> 2. Provide a Photo Point monitoring map that includes:

- Points showing the exact location of each photo monitoring point on the Ranch.
- Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
- Directional orientation of photos
- Map scale and North marker
- Landmarks such as labeled road crossings and waterways

3. Photo Log that includes:

- Site code
- Photo's code (digital label)
- Date photos were taken
- Description of what was being documented (riparian growth, project implementation, etc.)

D.2.b. Irrigation Management and Maintenance

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

> During regular maintenance work at diversions and fish screens, the Permittee will minimize the discharge of sediments, debris, fine organic matter, and/or muddy, turbid, or silt-laden waters into natural waterways. The Permittee will clean instream structures as necessary to maintain proper function.
>
> The Permittee will regularly inspect all fish screens and bypass pipes or channels to verify that they are effectively protecting salmonids and other fish species in accordance with CDFW and NMFS fish screening criteria. When necessary, the Permittee will clean and repair all fish screens and bypass pipes or channels. If a fish screen is removed for cleaning or repair, the Permittee will ensure either that a replacement screen is installed immediately, or water is not flowing through the area where the screen is removed by either implementing isolation or dewatering of the work site in coordination with the fish relocation effort described later in this document.
>
> When a bypass pipe is present, the bypass entrance(s) shall be installed and operated such that all life stages of the Covered Species including out-migrants can easily locate and enter them. All components of the bypass system, from entrance to outfall, shall be designed and operated to minimize the potential for debris blockage and must be sized to accommodate all life stages of fish and aquatic species which may be drawn into the diversion. Sufficient flow (site specifically determined depending on the volume and type of bypass structure) will be supplied from the diversion into a fish bypass to safely and efficiently return fish back to the stream. Bypass outfalls shall be designed and located so that there is sufficient depth and velocity to avoid injury to all life stages of fish and aquatic life which may be directed into a bypass pipe.
>
> When cleaning/maintaining irrigation or drainage ditches, the Permittee will work when the ditch is as dry as possible to minimize or eliminate surface water turbidity and sediment transport. The Permittee will place sediment and organic materials excavated from ditches in a location where the materials cannot wash into any stream channel or Covered Species habitat.
>
> Permittee will regularly monitor and repair as necessary any earthworks or facilities designed to

minimize tailwater entering natural waterways.

Planned Instream work shall occur only when Covered Species are least likely to be present or affected by the project; between June 15 and November 1, or as approved by NMFS and CDFW

In the case where the fish screen is down-ditch, the Permittee shall notify CDFW at least 5 days prior to closing a headgate or valve when fish stranding may occur in the diversion conduit, to allow fish rescue notification and coordination by qualified individuals, NMFS and CDFW, or other mutually agreed upon individuals

When Permittee is diverting water under the rotational provision under the decree, the river shall not be dewatered and an agreed upon bypass amount will always be provided, as stipulated under the reach wide flow management plan and/or the Permittee's individual site plan

Monitoring

Log of maintenance activities carried out within the calendar year shall be included in the annual report

D.2.c. Riparian Pasture Grazing Management

Pasture grazing is the prevailing land use. Riparian pasture grazing is proposed for the Cardoza, Rattlesnake, and Hole in the Ground Creek fields. Per the Agreement for this section, where grazing of riparian pastures occurs the following AMMs will be applied:

Implement riparian grazing management plans in coordination with UC Cooperative Extension or other range management specialists.

Fenced riparian areas may be grazed in accordance with grazing management plans approved by the Parties. The grazing management plan will address standard grazing management principles, such as the seasonal timing, duration, and intensity (number of livestock allowable per unit area [i.e., stocking rate]), of livestock grazing within the riparian zone and will explain how the proposed management plan will result in improved riparian function and enhanced aquatic habitat. In addition, the grazing plan will describe the means by which the flash grazing will avoid and minimize impacts to stream banks, riparian vegetation, spawning and rearing areas, and avoid direct impacts to spawning and rearing coho salmon.

To avoid direct impacts to Covered Species spawning, incubation, and emergence, grazing in riparian pastures with streams that are accessible to the Covered Species will be allowed from May 1 to November 1 or as approved by CDFW or NMFS. The Permittee will perform at least one of the following actions prior to grazing livestock in riparian pastures where livestock could enter a stream between November 1 and May 9:

- Obtain written concurrence from NMFS and CDFW that potential Covered Species spawning habitat does not occur adjacent to the riparian pasture.
- If potential spawning habitat occurs adjacent to the riparian pasture, perform weekly redd surveys between November 1 and January 15. Redd surveys may be performed by NMFS, CDFW, or a qualified biologist. If surveys are performed by a non-agency biologist, written survey results will be provided to NMFS and CDFW for concurrence prior to grazing. If redds are not detected during the redd surveys, riparian grazing may occur in conformance with the Permittee's riparian grazing management plan.
- If redds are determined to be present, livestock may graze within the riparian pasture

between November 1 and April 30 if a temporary electric exclusion fence or wire is installed and between the riparian pasture and the stream bank, and provisions are made to supply off-channel stockwater. The electric fence must be checked and maintained daily.

Monitoring:

Where riparian grazing occurs:

Three to five permanent photo points will be established and marked at locations within each riparian pasture designed to show both vegetation changes before and after seasonal grazing activities, and long-term trends. Digital photographs will be taken at each photo point station once per year for trend monitoring, and before and after riparian pasture grazing takes place for annual implementation reporting. Permittee will provide a report with at least the following two sections:

1. Photo Point monitoring map that includes:

- Points showing the exact location of each photo monitoring point on the Ranch.
- Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
- Directional orientation of photos
- Map scale and North marker
- Landmarks such as labeled road crossings and waterways

2. Photo Log that includes:

- Site code
- Photo's code (digital label)
- Date photos were taken
- Description of what was being documented (riparian growth, project implementation, etc.)

Maintain a log of grazing activities carried out within the calendar year and include in the annual SHA report. At a minimum, the log will include the following, beginning and end dates of riparian pasture grazing, number of animals, monitoring practices during the riparian grazing period, and management actions taken as a result of monitoring including management cues used to determine the time to move livestock out of the riparian pasture.

NMFS and CDFW may initiate periodic inspection of grazed riparian pastures to ensure the riparian grazing management plan is effective.

D.2.d. Fence Maintenance

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

Inspect riparian exclusion fencing during and after each season of grazing and after high flow events where over bank flows may inundate fences and prior to and after riparian grazing has occurred. If riparian exclusion fencing is damaged, repair fencing and move livestock, as appropriate, to minimize resource impacts. If cattle are present, riparian fences shall be repaired within 30 days.

If riparian fences are lost due to a catastrophic event, the Permittee shall notify agencies of the loss in the annual report. The Permittee will repair up to 20% of fencing and request funding assistance for the remaining repairs beyond the percentage of its commitment. Cattle shall not have access to areas of riparian areas normally excluded through other provisions of the AMM's.

Monitoring:

A short description of fence maintenance activities will be included in the annual report.

D.2.e. Road Maintenance

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

Ensure fish passage at road crossings of streams that are accessible to the Covered Species including at bridges, wet crossings and culverts. Any instream crossing structure will be designed and implemented in accordance with the fish passage evaluation methods specified in the 2010 4th edition of the Department's California Salmonid Stream Habitat Restoration Manual. The most current edition of the manual is available at: http://www.dfg.ca.gov/fish/Resources/HabitatManual.asp.

Minimize erosion and sedimentation from roads and road work. Rock road crossings and approaches to stream channels to minimize sedimentation. Utilize mulch or other suitable materials, as necessary, to minimize sediment runoff and transport to surface waters. Apply mulch so that not less than 90% of the disturbed areas are covered. Apply all mulches, except hydro-mulch, in a layer not less than two (2) inches deep. Where appropriate, all mulches shall be kneaded or tracked-in with track marks parallel to the contour, and "tackified" as necessary to prevent excessive movement. All exposed soils and fills, including the downstream face of the road prism adjacent to the outlet of culverts, will be reseeded with non-invasive species at a rate which will ensure establishment.

Planned Instream work shall occur only when Covered Species are least likely to be present or affected by the project, typically from June 15 through November 1.

Avoid using native surface roads for heavy traffic during wet or thaw periods, and roads not designed and constructed for these conditions. Evaluate the future needs for a road and close roads that will not be needed. Inspect roads annually to determine the need for structural maintenance. Conduct maintenance practices, when conditions warrant, including cleaning and replacement of deteriorated structures and erosion controls, grading or upgrading road surfaces with aggregate. Properly maintain permanent stream crossings and associated fills and approaches to reduce the likelihood (a) that stream overflow will divert onto roads, and (b) that fill erosion will not occur if the drainage structures become obstructed

Monitoring:

A short description of annual road maintenance activities will be included in the annual report.

D.2.f. Vehicle and Livestock Wet Crossings and Watering Access Lanes

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

Cross vehicles and livestock only at stable designated locations where potential spawning gravel, incubating eggs, and fry are not present. Wet crossings and watering access for cattle should be armoured with rock. Fencing should be installed to guide the cattle to the crossing and, where necessary, across the stream on the armoured surface while minimizing impacts to the stream and stream banks.

Factors considered when selecting a crossing and/or watering access location include the stream gradient, channel width, and the ability to maintain the existing channel slope. Generally, to construct a crossing, a boulder weir is placed on the downstream side of the crossing and angular quarry rock is placed in the crossing location; the width of the crossing does not exceed 25 feet; the crossing spans the entire width of the channel; the crossing is "keyed" into the bank on each side; the approaches on both sides do not exceed a slope of 3:1; and bank armoring (usually using quarry rock) is added where needed. Watering access lanes are of similar construction and may or may not span the width of the channel.

Angular rock will be applied to the crossing, or watering access lane, during the period of June 15 through November 1 and maintained over time. The diameter of angular rock will be selected so as to eliminate the risk of angular rock becoming a grade control affecting channel conditions. In locations where the stream crossings occur on intermittent streams, application of rock shall occur when the stream channel is dry.

Once a crossing, or watering access lane, is established, the landowner will collaborate with agency staff after high flow events and/or after gravel introduction, to inspect the crossing and ensure it has not been compromised. The inspection shall be completed in spring or early summer.

When operating vehicles in wetted portions of a stream channel, check and maintain vehicles on a daily basis to prevent leaks of materials that, if introduced to water, could be deleterious to aquatic life, wildlife, or riparian habitat; minimize the number of passes through the stream to avoid increasing the turbidity of the water to a level that is deleterious to aquatic life; and allow the work area to "rest" after each individual pass of the vehicle that causes a plume of turbidity above background levels, resuming work only after the stream has reached the original background turbidity levels.

Monitoring:

All maintenance activities related to vehicle and livestock crossing and watering access will be monitored as follows:

Provide Photo Monitoring in the Annual SHA report that can clearly document changes over time and/or management activities. The Permittee will do the following as part of photo point monitoring:

1. Establish, label and re-occupy set photo points, with a permanent marker in view of the photo monitoring point (i.e. fencepost, hillside, large tree, etc.).

2. Provide a Photo Point monitoring map which includes:

- Points showing the exact location of each photo monitoring point on the Ranch
- Labels for each photo monitoring point with a site code (Ranch ID/Photo Point #)
- Directional orientation of photos
- Map scale and North marker
- Landmarks such as labeled road crossings and waterways.

3. Photo log which includes:

- Site code
- Photo's code (digital label)
- Date photos were taken
- Description of what was being documented (riparian growth, project implementation, etc.)

D.2.g. Herbicide (Weed Management), Fertilizer, and Pesticide Use

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

Ensure that any pesticide or herbicide is handled and applied by a licensed applicator (when required) in accordance with and all applicable, federal, state, local laws, regulations, procedures, and guidelines. Application of pesticides will be in conformance with the pesticide label as well as any required buffers from anadromous streams in conformance with the Order entered in Washington Toxics Coalition et al. v. Environmental Protection Agency et al., (W.D. Wash No. C01-132C) (January 22, 2004). When possible, areas will be spot treated to reduce the amount applied. Use of broad spectrum insecticides will be minimized or avoided as they are more likely to be harmful to non-target organisms including fish and aquatic insects if exposed. Chemicals with the lowest possible toxicity rating will be used when possible. Use of mobile, pre-emergent herbicides will be minimized or avoided as they can impact non-target plants in the riparian area leading to other impacts such as sedimentation. The Applicant will avoid or minimize exposing aquatic resources by managing spray drift. This includes using modern spray equipment (e.g., low volume or electrostatic sprayers); routinely checking for nozzle wear and calibrating the sprayer frequently throughout the growing season; turning off the sprayer along creeks, drainages and in the turn-around areas; supervising the spraying to minimize effects to surface waters.

Use care to minimize fertilizer use in applications that could result in nutrient loading to natural waterways.

Review label information and avoid the use of any material known to be detrimental to fish where it could impact Covered Species.

Use or store stationary petroleum-powered equipment in a manner to prevent the potential release of petroleum materials into natural waterways by use of drip pans or other measures

Refuel machinery and handle or store hazardous materials no less than one hundred and fifty (150) feet away from the edge of any water body. All unused or leftover materials will be transported off-site and properly disposed of, when applicable.

Monitoring:

A log of herbicide, fertilizer, and pesticide use activities carried out within the calendar year shall be included in the annual report.

D.2.h. Flood or Emergency Events

Per the Agreement for this section, the following AMMs will be applied on the Ranch:

Prior to, during or immediately after the event, NMFS and CDFW will be contacted and AMMs will be developed in coordination with the Permittee for the particular flood or emergency circumstances.

NMFS and CDFW will be notified within 14 days of beginning emergency work per Fish and

Game Code 1610.

Monitoring:

Photographs of the emergency site repairs and a detailed description of the repairs to be included in the annual report.

E. Beneficial Management Activities

This section provides a detailed description of Conservation and Habitat Enhancement Activities that are ongoing and those that will be implemented on the Enrolled Property for the benefit of the Covered Species.

E.1. Completed and Sustained Beneficial Management Activities

This section details the actions required to maintain Baseline Conditions. This includes any land and/or water management activities that are being implemented, or have been implemented, on the enrolled property that benefit the Covered Species and will be maintained over the duration of the Safe Harbor Agreement. This section includes completed studies and research by Permittee and others that continue to contribute to the knowledge base informing the Agreement.

E.1.a. Hydrology/Water Quality

Increased delivery and irrigation efficiencies (Completed and Sustained)

- With funding provided by the Pacific States Marine Fisheries Commission under a grant from NMFS, in cooperation with CDFW, undertook an irrigation efficiency study
- Cooperated in more than seven years of CDFW studies of juvenile salmonid distribution and habitat use with direct observations, PIT tag technology, water temperature monitoring, flow monitoring, etc.
- Replaced 500 feet of open ditch with pipe on the Gravity Ditch,
- Repaired concrete lining on 1500 feet of main Pump Diversion, Main Ditch, 2013
- Upgraded irrigation turnouts on 300-400 feet of Pump Diversion, Alyssa Field Ditch, 2013
- Manage, currently and for the foreseeable future, diversion of Appropriative Water Right for "Clear Spring" to protect water quality for instream habitat. Spring flow may fluctuate annually, seasonally and diurnally, so full right of 2.5 cfs is generally not diverted to accommodate the variability, thereby improving stream temperatures below the Pump Station POD and increasing volume of the summer rearing habitat for juvenile salmonids, especially 0+ coho and steelhead.
- Permittee agrees to maintain concrete lining on main delivery ditch of Pump Diversion
- Permittee is cooperating with UCCE to experiment with the use of soil moisture sensors and related technology to optimize applied water, which may result in a reduction of diversion and, ideally, improved instream water quality

Tailwater Reduction (Completed and Sustained)

- Since 2009, modified practices on Gravity Ditch to irrigate short and/or steep pastures, which require more frequent changes, during the day. The more distant, flatter, and

longer pastures are irrigated at night

- Permittee repaired and/or established tailwater berms at the low side of irrigated pastures
- Permittee agrees to continue and refine irrigation practices that minimize applied water accumulating at the low side of fields
- Permittee agrees to maintain tailwater berms and continue irrigation practices that reduce to insignificant or eliminate tailwater returning as warm surface flow to perennial streams

Participation in reach-wide Diversion Management Plan (Completed)

- Participated in July, 2015 flow/diversion experiment in the upper Shasta River to evaluate alternative diversion coordination scenarios
- Participated in MWCD pulse flow/environmental water release experiments with access for monitoring
- Cooperated in McBain and Trush, Big Springs Complex Interim Instream Flow Needs study with access and data

Upgrade/repair/maintain diversion facilities (Completed)

- Permittee has cooperated in studies to redesign neighbor's diversion located on the property (-122.44445, 41.56325; the Cardoza Diversion) with access through the property and despite anticipated pasture management changes to accommodate a potential loss of sub-irrigated acreage.
- Permittee has cooperated in studies to evaluate Hole in the Ground Creek for alternative water supply for neighbor's property

Water exchanges (Completed)

- In 2008, due to the research in which the Permittee cooperated, allowing CDFW personnel to study distribution and habitat use by coho juveniles in the Shasta River through the Ranch, it was determined that coho were rearing downstream of Clear Spring. In that year, CDFW expressed concerns for late summer habitat water quality, specifically the water temperature. Permittee agreed to exchange diversion of water from Clear Spring for deliveries of MWCD stored water. The stored water was diverted at the Gravity Diversion, which is upstream of the Clear Springs diversion. In addition, the Pump Diversion, which is the POD for water from Clear Springs, was not used for the balance of the irrigation season. By refraining from diverting at the Pump Station, cold water signature from the spring source was maintained further downstream increasing the amount of summer-rearing habitat available for coho and steelhead. Prior to 2008, it was not known that the reach of river between the Gravity and Pump diversions was utilized by these species during the summer. Indeed, it is likely that the reach was inaccessible to juveniles due to the configuration of the Pump diversion, a condition that was corrected in 2007 *(See below, Section E.1.b. Remediation of identified on-site barriers)*

E.1.b. Passage/Migration/ Diversion Screening

Research (Completed)

- Permittee conducted for one year and continues to participate in spawner surveys for all

reaches with suitable spawning habitat

- Permittee cooperated in more than seven years of CDFW studies of juvenile salmonid population estimates, distribution, and habitat use with direct observations, PIT tag technology, water temperature monitoring, flow monitoring, etc.

Remediation of identified on-site barriers (Completed)

- Modified Gravity Ditch Diversion from flashboard dam to roughened channel, eliminating potential juvenile coho barrier; improved fish screen; 2007
- Modified Pump Diversion from flashboard dam to roughened channel, eliminating a large impoundment which contributed to degraded water quality downstream and created a barrier to juvenile coho; improved fish screen; 2007
- Permittee agrees to maintain fish passage through roughened channel reaches

E.1.c. Riparian Function/ Channel Structure

Riparian Fencing (Completed and Sustained)

- Permittee, with matching funding from USFWS Partners in Conservation Program, has fenced 100% of Shasta River to exclude cattle grazing
- Permittee, with matching funding from USFWS Partners in Conservation Program, has fenced 60% of Parks Creek to exclude cattle grazing
- Permittee agrees to maintain riparian fencing
- Permittee agrees to replace, out-of-pocket, at least 20% of riparian fencing if needed due to high flow damage. Partners for additional funding to replace fencing to 100% will be sought, if necessary.

Crossings on Fish-bearing Stream Reaches (Completed)

- Permittee has limited cattle and vehicle access to the Shasta River to three vehicle crossings and six stock crossings (inclusive; i.e. vehicle crossings also serve as stock crossings when necessary)
- In the exclusion fenced portion, Permittee has limited cattle and vehicle access to Parks Creek and tributaries to two crossings -- one rocked ford, and one culvert crossing
- Permittee agrees to maintain crossings and cap the number of livestock and vehicle access points to current number

Off-Channel Stock watering (Completed)

- Permittee created two off-channel tanks/ponds for stock water to support riparian exclusion

Beaver management (Completed)

- Permittee provided access and/or labor on several occasions to monitor and breach beaver dams

Riparian Habitat -- No projects or practices specific to this parameter

E.1.d Spawning Substrate

Riparian function measure (Completed) (Also see Section E.1.c., above)

- Cooperated in McBain and Trush study (*McBain & Trush, et al., 2010)* by allowing access for evaluation of gravel composition and quality. Summarizing the findings:
  - Reductions to spawning gravel supply and spawning gravel storage within mainstem and tributary spawning areas have reduced spawning gravel availability and gravel quality for salmon spawning habitat.
  - The quantity of spawning gravel in the mainstem Shasta River and in key tributary reaches can be increased, and the quality of existing spawning gravel can be improved.
  - Based on current and projected coho salmon population estimates by CDFG, spawning gravel inventory results suggested that the existing spawning gravel quantity is adequate to sustain current (and support projected) populations, but that the quality of existing spawning gravel may be limiting fry production and thus should be improved.
  - For Chinook salmon, however, results suggested spawning gravel quantities may be limiting populations in high escapement years, and that gravel augmentation will be needed in the near future to sustain current spawning gravel supplies as well as allow Chinook salmon population to expand beyond current levels.
  - An enhancement strategy was proposed that first focuses on coho salmon habitat (due to a significantly reduced population) and then focuses on Chinook salmon habitat.

E.1.e. Sediment/Turbidity

Riparian function measures, See Section E.1.c., above

Tailwater reduction measures, See Section E.1.a., above

E.1.f. Floodplain Function − *No projects or practices specific to this parameter*

E.1.g. Pasture Management

Pasture Grazing Management (Completed and Sustained)

- Fall calving producing calves big enough to fully utilize upland, seasonal range, comprising more than half of the Ranch
- Rotation and stocking rates in irrigated and non-irrigated pasture managed to maintain optimum forage cover and heights based on water year type

E.2. Proposed Beneficial Management Activities for Elevated Baseline

E.2.a. Hydrology/Water Quality

Increased delivery and irrigation efficiencies

With acquisition of sufficient matching funds, Permittee agrees to complete, operate, and maintain a Diversion Combining Project, which includes replacing up to 4000 feet of open, mostly earth-lined Gravity Ditch with pipe. Upon completion, seepage loss savings (estimated at 0.7 cfs) will be exchanged for an equal volume of Clear Spring water retained in-stream and not diverted. Time Frame: Underway; Completion Estimated within 5 years of permit issuance.

In the interim, before completion of the Diversion Combining Project, Permittee agrees to collect further data to quantify ditch loss to be translated into efficiency savings with implementation of the completed Project.

Permittee will seek matching funds to and establish fences to create riparian pastures or exclusion fencing on Hole in the Ground Creek. Time Frame: Within 5 years of permit issuance

Tailwater Reduction

Permittee agrees to work cooperatively with neighboring landowners to solve issue of warm surface water, from source not on Permittee, entering Hole in the Ground Creek near north property line. Time Frame: Within 5 years of permit issuance

Soil Moisture Monitoring Program

See *Section E.3.a.*, below

Participation in reach-wide Diversion Management Plans

See *Section E.3.a.*, below

Upgrade/repair/maintain diversion facilities

Permittee agrees to continue participating in studies to redesign neighbor's diversion (which is located at 122.44445W, 41.56325N; Cardoza Diversion) and eliminate associated water quality issues. Participation includes providing access for personnel and equipment during design and construction, implementation monitoring, and effectiveness monitoring, and adjusting livestock management to accommodate project design, construction, monitoring, and post-construction changes in vegetation. Time Frame: Underway; Completion Estimated within 5 years of permit issuance

Also see *Diversion Combining Project*, described above in *Section E.3.a*., below

Water exchanges – None proposed

Diversion relocation/combination – None proposed

E.2.b. Passage/Migration/ Diversion Screening

Remediation of identified on-site barriers

Permittee agrees to continue cooperating in project to move Cardoza Diversion, eliminate associated fish passage issues, and maintain fish passage at the new crossing. See *Section E.2.a.,* above. Time Frame: Underway; Completion Estimated within 5 years of permit issuance

Also See *Section E.3.c. "Beaver Management"*, below

E.2.c. Riparian Function/ Channel Structure

Riparian Fencing

Permittee agrees to establish fences to create riparian pastures or exclusion fencing on remaining 40% of Parks Creek. Permanent fencing materials and alignment will be determined after ~5 year riparian grazing trials using temporary electric fence following recommendations from UCCE. Temporary fencing will be used for up to the first five years after permit issuance. Permanent fencing will be established by the sixth year after permit issuance.

See E.2.a., above, regarding Hole in the Ground Creek Riparian Fencing

Prescribed Riparian Grazing Intensity/Frequency

Riparian grazing plan, developed by UCCE Range Specialists for riparian pastures along Parks Creek at the Cardoza and Rattlesnake fields, will be implemented. *See Attachment: UCCE Riparian Grazing Recommendations for Hole in the Ground Ranch*. Time Frame: Within 2 years of permit issuance

Riparian grazing plan will be developed in consultation with UCCE Range Specialists for riparian pastures along Hole in the Ground Creek and will be implemented. Time Frame: Within 5 years of permit issuance

Crossings

Permittee agrees to cap number of crossings to current without consulting NMFS and CDFW

Permittee agrees to continue participating in project to restore stream function at crossing on site of Cardoza Diversion that is slated to be moved. Time Frame: Underway; Completion Estimated within 5 years of diversion being moved.

Off-Channel Stock watering - No additional proposed

Beaver management – None proposed

Riparian Habitat

Five years, or more if agreed upon, after the alteration of Cardoza Diversion, Permittee will take part in evaluation of riparian conditions and planting projects where existing riparian habitat is less than site-potential along Parks Creek. Time Frame: Within 5 years of completion of diversion alteration project

Riparian management (e.g. promote aquatic vegetation growth) – None proposed

Channel Structure Improvement (e.g., instream LWD additions)

Post-alteration of Cardoza Diversion, Permittee agrees to cooperate in evaluation and placement of instream LWD placement, as appropriate, in Parks Creek. Time Frame: Within 5 years of completion of diversion alteration project

E.2.d Spawning Substrate

Riparian function measures, See Section E.2.c., above

Providing access to potential augmentation projects

Post-alteration of Cardoza Diversion, Permittee agrees to evaluate and take part in gravel augmentation projects, as appropriate, in Lower Parks Creek. Time Frame: Within 5 years of completion of diversion alteration project

E.2.e. Sediment/Turbidity-

See 'Hydrology/Water Quality: Tailwater Reduction," Section E.2.a., above

See Riparian Function/Channel Structure, Section E.2.d., above

E.2.f. Floodplain Function

Identification of potential floodplain habitat sites – None proposed

Beaver management to promote floodplain function

See "Riparian Function/Channel Structure: Beaver Management," Section E.3.c., above

E.2.g. Pasture Management

Pasture Grazing Management – None proposed

E.3. Other Proposed Beneficial Management Activities

E.3.a. Hydrology/Water Quality

Increased delivery and irrigation efficiencies

With acquisition of sufficient matching funds, Permittee agrees to complete Diversion Combining Project, which includes replacing up to 4000 feet of open, mostly earth-lined Gravity Ditch with pipe. Upon completion, seepage loss savings (estimated at 0.7 cfs) will be exchanged for an equal volume of Clear Spring water retained in-stream and not diverted. Time Frame: Underway; Completion Estimated within 5 years of permit issuance

Tailwater Reduction – No additional proposed

Soil Moisture Monitoring Program

Permittee agrees to include Ranch pastures in Project Area for testing effectiveness of soil moisture sensor technology to increase irrigation efficiency, implement routine use where appropriate, and adjust water management accordingly

Participation in reach-wide Diversion Management Plans

Permittee agrees to continue participating in the Upper Shasta River Flow Management Strategy. Time Frame: For duration of permit issuance

Upgrade/repair/maintain diversion facilities

Permittee agrees to continue participating in studies to redesign the Cardoza Diversion and eliminate associated water quality issues. Participation includes providing access for personnel and equipment during design and construction, implementation monitoring, and effectiveness monitoring, and adjusting livestock management to accommodate project design, construction, monitoring, and post-construction changes in vegetation. Time Frame: Underway; Completion Estimated within 5 years of permit issuance

Also see Diversion Combining Project, described above.

Water exchanges

Permittee agrees to an exchange with MWCD for Clear Spring water, per Upper Shasta River Flow Management Strategy. The Permittee commits to an annual irrigation season plan that,

generally, proceeds as follows:

1) Assuming new infrastructure at the Gravity Diversion, and down-ditch, is in place to allow the full water right used on the Ranch, to be diverted at the HIG Gravity Diversion *(See Section E.2.a. Upgrade/operate/repair/maintain diversion facilities and Diversion relocation/combination)* and
2) Assuming there is a temperature monitoring station in the vicinity of the south property line and upstream of the HIG Gravity Diversion (currently "HVR DS PL" fulfills that role),
3) Permittee may divert Clear Spring per the license, less any instream commitments exchanged for efficiency improvements in the Gravity Ditch, at the start of the irrigation season
4) Annually, when 18°C MWAM is reached at the water temperature monitoring station (currently "HVR DS PL"), HIG will receive a volume of "Exchange" water from MWCD to substitute for the volume of Clear Spring being diverted at which time…
5) Permittee will cease diverting Clear Spring and…
6) Permittee will divert the combined diversion amounts for HIG Gravity and Pump diversions at only the Gravity Diversion.
7) Annually, if below 18°C MWAM temperatures occur, nearing the end of the irrigation season (November 1), when air temperatures are averaging cooler, Exchange water may be curtailed and Clear Spring may be diverted at the HIG Pump Diversion

Time Frame: Within 5 years of permit issuance

Diversion relocation/combination

See Diversion Combining Project, described above in Section E.3.a.

Forbearance Agreement

Permittee agrees to enter into a Forbearance Agreement with SWCG members for the purpose of improving habitat for the Covered Species in the Shasta River

E.3.b. Passage/Migration/ Diversion Screening

Remediation of identified on-site barrier – None proposed

E.3.c. Riparian Function/ Channel Structure

Riparian Fencing – No additional proposed

Prescribed Riparian Grazing Intensity/Frequency – No additional proposed

Crossings – No additional proposed

Off-Channel Stock watering - No additional proposed

Beaver management

Permittee agrees to create a management plan to, at a minimum, not deter dam building beaver activity except where it damages infrastructure, e.g. impairs irrigation control structures, inundates crossings, etc. When necessary, Permittee will work in conjunction with fisheries management personnel to physically breach dams during smolt outmigration, juvenile

redistribution, and/or adult spawning periods, generally April to mid-June and November to January or provide alternate passage opportunities through or around the beaver dams. Time Frame: Within 5 years of permit issuance

Riparian Habitat

With additional funding, Permittee agrees to take part in riparian planting projects where existing riparian habitat is less than site-potential along the Shasta River. Time Frame: Within 15 years of permit issuance

Riparian management (e.g. promote aquatic vegetation growth)

Permittee agrees to maintain fences and utilize adaptive management approach to monitor, assess, and, where necessary, modify riparian management practices, whether exclusion or prescriptive grazing strategies

Channel Structure Improvement (e.g., instream LWD additions)

Permittee will take part in projects to add up to15 LWD structures in reach between Pump Diversion and north fenceline (*See Figure 5)*. Existing pools with documented use by juvenile salmonids will be considered priority sites. Time Frame: Within 10 years of permit issuance

E.3.d Spawning Substrate

Riparian function measures, See Section E.3.c., above

Providing access to potential augmentation projects

Permittee agrees to take part in project(s) to add gravel in Shasta River at up to 4 sites between Pump Diversion and north fenceline *(Figure 5)*. Existing riffles will be considered as priority sites. Time Frame: Within 10 years of permit issuance

E.3.e. Sediment/Turbidity

None proposed

E.3.f. Floodplain Function

Identification of potential floodplain habitat sites – None proposed

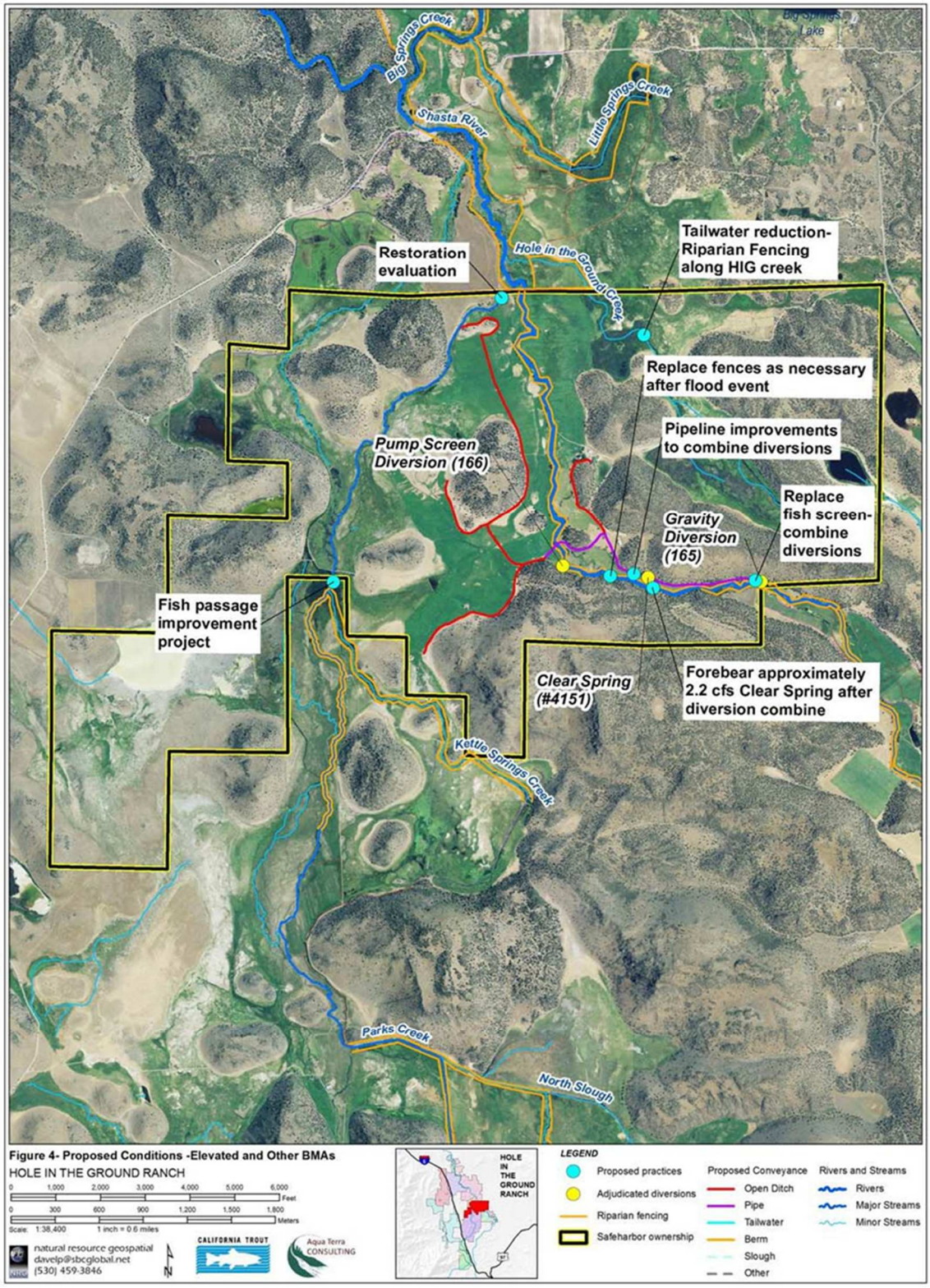
Beaver management to promote floodplain function

See "Riparian Function/Channel Structure: Beaver Management," Section E.3.c., above

E.3.g. Pasture Management

Pasture Grazing Management – No additional proposed

Figure 4. Hole in the Ground Ranch: Proposed Conditions



F. Effective Date and Duration of the Site Plan and Agreement

The Template Safe Harbor Agreement, Site Plan Agreement and Permit take effect when signed by the Participants/Permittees, NMFS, and CDFW. The Template Safe Harbor Agreement, Site Plan Agreement and Permit have a term of 20 years, which may be extended by mutual written consent of the Participants/Permittees, NMFS, and CDFW as stipulated in the Agreement. One (1) year prior to end of term of the Template Safe Harbor Agreement, Site Plan Agreement and Permit, the Participant/Permittees, NMFS, and CDFW will meet to decide whether to extend the term of the Template Safe Harbor Agreement, Site Plan Agreement and Permit.

G. Monitoring and Reporting

G.1 Monitoring

Implementation monitoring includes those monitoring tasks associated with construction and implementation of BMAs (e.g. construction of habitat restoration projects) and AMMs. Implementation monitoring of BMAs serves to verify that habitat restoration projects are constructed as designed or intended. AMMs are intended to minimize or reduce potential adverse impacts that may occur during implementation of BMAs or during routine ranching and farming activities. Implementation monitoring protocols for AMMs are described in the Agreement. These actions will be conducted by the Permittee, the SWCG, or a contractor.

Table 4. Summary of Monitoring Efforts

Beneficial Management Activity	Hole in the Ground Ranch Projects	Implementation Monitoring Technique	Effectiveness Monitoring
A. Instream Habitat Structures & Improvements	Access for addition of large wood enhancement, up to 15 sites on Shasta River and undetermined number of sites on Lower Parks Creek *(Hole in the Ground Section E.2.d.; Figure 5)* *Time Frame: Within 10 years of permit issuance* Access to implement spawning gravel enhancement, up to 4 sites on Shasta River and undetermined number of sites on Lower Parks Creek *(Hole in the Ground Section E.2.e.; Figure 5)* *Time Frame: Within 10 years of permit issuance*	one to two photopoints per LWD structure and per gravel placement site, will be established, before and upon completion of project, using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document	Reasonable access for monitoring salmonid use of LWD *Time Frame: until use is established; Adaptive Management Monitoring of, e.g. distribution, is addressed elsewhere*
,B. Beaver Management	Agree to develop and implement in beaver management plan *(Hole in the Ground Section E.2.c)* *Time Frame: Within 5 years of permit issuance*	Completed plan to include parameters for seasonal dam monitoring for fish passage; dam removal or modification process when necessary; and variables to be reported; will be in Annual Report	

Beneficial Management Activity	Hole in the Ground Ranch Projects	Implementation Monitoring Technique	Effectiveness Monitoring
C. Barrier Modification for Fish Passage Improvement	Cooperation in and adjustments for removal of diversion and upgrade of crossing on Parks Cr. at 122.44445W, 41.56325N. *Time Frame: Underway; Completion Estimated within 7 years of permit issuance*	three to five photopoints will be established, before and upon completion of diversion removal project, using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document	
D./I. Bioengineering and Riparian Habitat Restoration	Agree to work collaboratively with Agencies to evaluate and **implementation** riparian habitat enhancement: Shasta R., Lower Parks Cr. (post-diversion removal), and Hole in the Ground Cr. *(Hole in the Ground Section E.2.c.) Time Frame: Within 5 years of completion of diversion alteration project* Agree to install balance of riparian fencing along Parks Creek (±40%) as riparian pasture borders consistent with recommendations of UCCE Range Conservation Specialists *(Site Plan Attachment: Tate & Rivers, 2016) Time Frame: Temporary fencing will be used for up to the first five years after permit issuance. Permanent fencing will replace temporary by the sixth year after permit issuance* With additional funding, Permittee agrees to take part in riparian planting projects where existing riparian habitat is less than site-potential along the Shasta River. *(Hole in the Ground Section E.2.c.) Time Frame: Within 15 years of permit issuance*	Report from an evaluation will be provided in the annual report and/or three to five photopoints will be established, before and upon completion of project, using *USDA Forest Service Photo Point Monitoring Handbook. 2002* Three to five photopoints will be established, before and upon completion of temporary fencing, annually if different than previous year. And 3-5 photopoints after permanent fence alignment is installed. Points will be established using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document three to five photopoints will be established, before and upon completion of riparian plantings using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document	
F. Removal of Small Dams	NA	NA	

Beneficial Management Activity	Hole in the Ground Ranch Projects	Implementation Monitoring Technique	Effectiveness Monitoring
G. Creation of Habitat: Off-channel/Side Channel	Post-alteration of diversion at 122.44445W, 41.56325N, agree to work collaboratively with Agencies to assess and, when matching funds are acquired, **implement** instream habitat improvement projects including channel morphology modifications in Lower Parks Creek *(Hole in the Ground Section E.2.d.)* *Time Frame: Within 5 years of completion of diversion alteration project*	Summary or copy of the report from an evaluation will be provided in the annual report and/or three to five photopoints will be established, before and upon completion of project, using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document	Reasonable access for monitoring salmonid use of new habitat, post-diversion removal. *Time Frame: until use is established; Adaptive Management Monitoring of, e.g. distribution, is addressed elsewhere*
H. Developing Alternative Stockwater Supply	NA	NA	
I. Riparian Restoration and Revegetation	*see D (above)*	*see D (above)*	
J. Research: New	Participate in studies to refine Upper Shasta River Flow Management Strategy *Time Frame: For 10 years from permit issuance* Provide access and collaborate with CDFW & NMFS to conduct innovative studies of salmonids in the Upper Shasta R.	reports of studies will be written/summarized/obtained and provided in the annual report	Reasonable access as needed for supplemental water temperature and/or flow data to augment SHA Water Quality Monitoring Network
K. Water Storage and Tailwater Capture Systems	NA	NA	
L. Piping Ditches	Agree to redesigning, rebuilding, operating, and maintaining Gravity Diversion, including piping approx. 4000' of conveyance, in order to facilitate Upper Shasta River Diversion Management Plan (Diversion Combining Project, *Hole in the Ground Section E.2.a.)* *Time Frame: Underway; Completion Estimated within 5 years of permit issuance*	three to five photopoints, before and upon completion of project, using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document,; as well as Reports of Licensee filed annually with SWRCB-DWR showing non-diversion of Clear Spring during summer irrigation	
M. Fish Screens	NA	NA	
N. Headgates and Water Measuring Devices	NA	NA	
O. Optimizing Cold Water Inputs	Permittee will seek matching funds and install riparian fencing along Hole in the Ground Creek *Time Frame: Within 5 years of permit issuance*	three to five photopoints will be established, before and upon completion of riparian fencing project along Hole in the Ground Creek, using SHA	Reasonable access for monitoring water quality parameters. *Time Frame: duration of agreement*

Beneficial Management Activity	Hole in the Ground Ranch Projects	Implementation Monitoring Technique	Effectiveness Monitoring
		photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document	
P. Combining and/or Moving Points of Diversion	Diversion Combining Project	three to five photos will be established, before and upon completion of project, using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document	Reasonable access for monitoring water quality parameters. *Time Frame: duration of agreement*
Q. Water Exchanges	Diversion Combining Project	three to five photos will be established, before and upon completion of project, using SHA photo monitoring protocol described in the "Covered Activities and Avoidance and Minimization Measures" document;	Reasonable access for monitoring water quality parameters. *Time Frame: duration of agreement*
R. 1707 Dedications	Agree to evaluate 1707 dedication for Clear Spring offset for Exchanges and Efficiency Savings *Time Frame: Underway; Completion Estimated within 5 years of permit issuance*	Annual report will include results of evaluation; mandatory Annual Report of Licensee to SWRCB itemizes monthly diversion volumes	Reasonable access for monitoring water quality parameters. *Time Frame: duration of agreement*

G.2. Annual Report and Adaptive Management

The Permittee will complete a report form annually and report as stipulated in the Agreement.

H. Regulatory Assurances

Upon execution of this Agreement by the Parties, and the satisfaction of all other applicable legal requirements, NMFS will issue a permit under Section 10(a)(1)(A) of the ESA to assure the Permittee they may incidentally take Covered Species, in accordance with the Site Plan and Agreement, as a result of Routine Land Use and Beneficial Management Activities as described in each Agreement, and except where such Routine Land Use would result in the diminishment or non-achievement of the Baseline and/or Elevated Baseline Conditions established for the enrolled property. This assurance depends on the Permittee maintaining the Baseline and/or achieving the Elevated Baseline Conditions set forth in the Site Plan, complying fully with the Agreement and their Site Plan, and so long as the continuation of Routine Land Use and Beneficial Management Activities would not be likely to result in jeopardy to Covered Species or the adverse modification or destruction of their designated critical habitat. NMFS provides no assurances with regard to any action that may affect Non-Covered species, including the take of Non-Covered Species and the adverse modification or destruction of their designated critical habitat.

I. Signatures of NMFS, CDFW and the Permittee

_____ _____

Permittee **Date**

_____ _____

NMFS **Date**

By signing the Template Safe Harbor Agreement and this Site Plan Agreement CDFW expresses its expectation that the Agreement along with a Permittee's Site Plan Agreement signed by NMFS, and the NMFS ESP, could meet the requirements of section 2089.22 of the California Fish and Game Code with respect to the particular property described in the Site Plan Agreement. However, CDFW will not make such determination until reviewing that Site Plan Agreement signed by NMFS and the NMFS ESP.

_____ _____

CDFW **Date**

Attachment: UCCE Riparian Grazing Recommendations for Hole in the Ground Ranch

Hole in the Ground Ranch

Draft Prescribed Riparian Grazing Management Recommendation (October 18, 2016)

Prepared by
Kenneth W. Tate, Professor and UCCE Rangeland Watershed Specialist, UC Davis
California Certified Rangeland Manager #79; CA Department of Forestry and Fire Protection
Certified Rangeland Professional #00-104; Society for Range Management
Carissa Koopmann Rivers, Livestock and Natural Resources Advisor, Siskiyou County, UCCE

Riparian Areas on the Ranch
Approximately 2.5 miles of the Shasta River flows through the middle of this ranch, and 1.7 miles of Parks Creek flows through the west, west-central portion of this ranch *(see Figure 2)*.

Some of the widest extent and best quality woody riparian corridors on the Shasta River SHA area occur along the river as it flows through the Ranch (B. Henderson, CDFW, *pers. comm.*). The entire Shasta River is narrowly corridor fenced to permanently exclude livestock through this reach, with 6 water gaps designed to allow livestock crossing and drinking water access. The fence is in excellent condition and effective at controlling livestock access to the river – there has been no grazing in this reach since 2010. This reach provides Coho spawning, rearing, out-migration, and emigration habitat. Noxious weeds are of limited extent in this reach.

DRAFT

The downstream end of the Lower Parks Creek reach on this ranch (approximately 930') is also narrow-corridor fenced to permanently exclude livestock, with 2 water gaps designed to allow livestock crossing and drinking water access *(Parks Creek Reach 1; see Figure 3)*. The fence is in excellent condition and effective at controlling livestock access to the river – there has been no grazing in this reach since 2011. This reach provides coho spawning, out-migration, and emigration habitat. Noxious weeds are of limited extent in this reach.

By the definitions used in the discussions regarding stream habitat restoration, the upper reach of Lower Parks Creek on this ranch is contained within an irrigated pasture, and is open to grazing by livestock during grazing bouts in this pasture, the Cardoza Field *(Parks Creek Reach 2; see Figure 6)*. This reach currently provides coho out-migration and emigration habitat. As intermediate between spawning habitat downstream on Parks Creek and the Shasta River, and other tributaries, and cold water refugia habitat, upstream in the Middle Parks Creek reach, this reach holds potential for fry rearing habitat as water quality conditions improve as a result of the actions undertaken in this SHA. This is a low gradient, fine substrate reach with high water table supporting primarily wetland herbaceous species dominated by *Juncus* (rushes) and *Carex* spp. (sedges). Noxious weeds are of limited extent in this reach.

Riparian Grazing Management Recommendations
Shasta River and Lower Parks Creek, Reach 1: Riparian Corridors. The Ranch owner and managers have made a decision not to graze these riparian corridors – maintaining these units as livestock exclosures. Our recommendation is that managers maintain the riparian corridor fences and water gaps in good working order, and check that the fences are effectively excluding livestock during grazing bouts in adjacent irrigated pastures and rangelands.

Lower Parks Creek, Reach 2: Riparian Pasture. The Ranch owner and managers have expressed interest in developing an adaptive riparian grazing strategy to improve streambank vegetation and habitat conditions within this reach. Management goals include reducing bare streambank, enhancing *Juncus* and *Carex* spp. cover and vigor at the stream's greenline. Accomplishing these short-term goals will in the longer-term lead to enhanced streambank stability, reduced stream channel width to depth ratio, and improved instream habitat conditions (e.g., cooler temperatures, increased hiding cover from predators, improved refuge from high velocities). Due to high water table – it is unlikely this reach has the potential to support a significant riparian woody population. However, the prescribed riparian grazing recommendation below will create the opportunity for riparian woodies to establish and grow if the reach does have the potential to support them.

Riparian Grazing Infrastructure.
We recommend that the upstream reach of Lower Parks Creek (Reach 2) be fenced to create a riparian pasture in which prescribed grazing can be implemented to achieve the short and long-term goals described above. The Cardoza diversion is located near the top of this reach, and is slated for removal. It is difficult to predict exactly how removal of this long-time hydrologic constraint will influence flood flows, base flows, and channel migration through this lower end of Parks Creek (Figures 4 and 6). At this time we recommend that the managers use portable electric fencing on the east side of Parks Creek in the Cardoza Field to establish a riparian pasture (Figure 6). This will allow rapid deployment of that east boundary so that prescribed grazing can be implemented soon, but allows the managers to adjust as needed based on observations of livestock behavior and channel response to removal of Cardoza diversion. Once the optimal placement of the east boundary is determined over 2 to 3 years of adaptation as needed, a permanent fence can be established if desired – or electric fence can continue to be utilized. Livestock drinking water within this riparian pasture will be from Parks Creek. At this time the establishment of fixed, hardened livestock creek crossings or drinking access points is not recommended. Livestock crossing/drinking behavior should be monitored during the first year of riparian grazing and this recommendation revisited and adapted as needed based upon livestock behavior and extent/intensity of stream channel disturbance.

Recommended Seasons of Grazing and Livestock Management Decision Triggers.
This reach of the creek, Reach 2 (the upper reach of Lower Parks Creek), is not considered to be coho spawning habitat, thus grazing bouts can occur in this grazing unit at any time during the standard irrigation-growing season (spring through fall). The unit should not be continually grazed year-round. It should be worked into the normal rotation of livestock throughout pastures on the Ranch. Rest periods must occur during the growing season (i.e., early, mid, and/or late growing season rest from grazing should occur each year). Management decision triggers described below will ensure grazing intensity (e.g., stocking rate) and livestock impacts are in balance with short and long-term goals listed above.

Managers must have real-time indicators they can observe directly on the ground to make decisions about the readiness of riparian grazing units for grazing (e.g., sufficient forage for grazing), and when livestock need to be moved from a riparian unit to achieve conservation goals (e.g., excessive browse on recruiting riparian woody plans <5ft in height, excessive streambank disturbance). For this site we recommend that during any grazing bout, 1) physical hoof damage to stream banks be limited to no more than 20% of streambank per each side of stream; 2) minimum stubble height of browsed herbaceous vegetation at the stream greenline to not go below 3"; and that 3) browse on recruiting riparian woody plants (< 5ft in height – below cattle maximum browse height) be limited

to no more that 20% of current year's leader growth within the riparian unit. Once any of these three triggers is hit during a grazing bout, livestock should immediately be rotated out of the riparian unit.

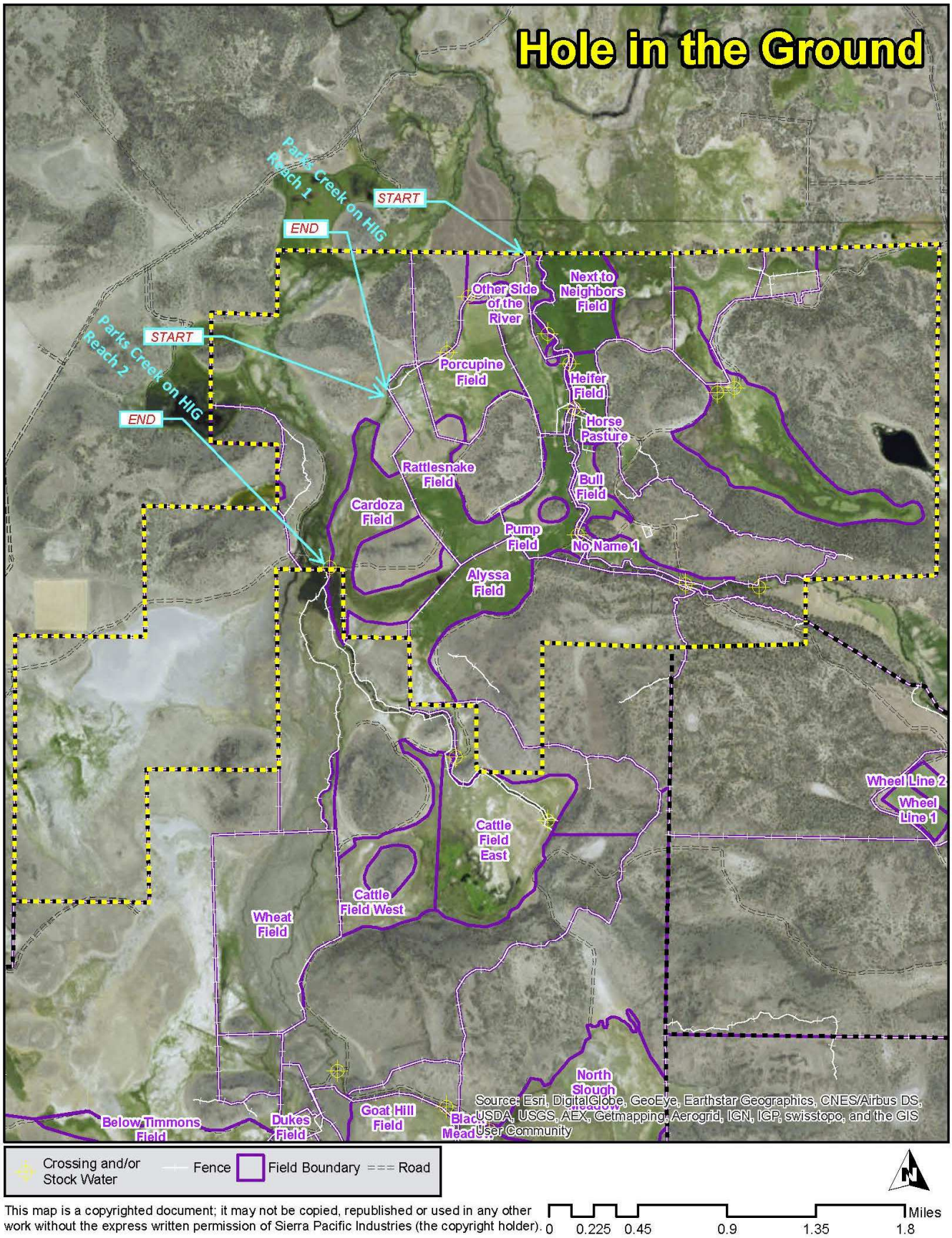
Table 1. Management triggers

Indicator	Trigger
Browse use on recruiting riparian woody species < 5 ft. in height	20% of current years leader growth
Streambank Hoof action	20% of each side of a streambank

Recommended Grazing Monitoring and Documentation.
Siskiyou County UCCE and UC Davis will collaborate annually to provide hands-on, in-the-field training on assessing real-time status of the livestock management decision triggers recommended in the section above. We will base this training on standard, national methods developed in the "Multiple Indicator Monitoring (MIM) of Stream Channels and Streamside Vegetation" (http://www.blm.gov/nstc/library/pdf/MIM.pdf).

We recommend progress towards these management triggers be assessed every 2 to 3 days during all riparian grazing bouts. We recommend, and will provide training on, the establishment of permanent photo monitoring points in the riparian grazing unit. Photos should be taken at the beginning and end of each grazing bout (certainly within the first few years of grazing). Photo points should be established so that riparian woody species, herbaceous stubble height at the stream greenline, and streambank conditions can be clearly observed and thus conditions and outcomes documented. Finally, we recommend that dates on and off, and numbers of livestock by species and class used during each grazing bout be recorded for each riparian grazing unit.

Figure 6. Hole in the Ground Ranch: Riparian Grazing, Parks Creek Reference Locations



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